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Notes on two Species of *Alternaria*.

BY L. R. JONES AND A. J. GROUT.

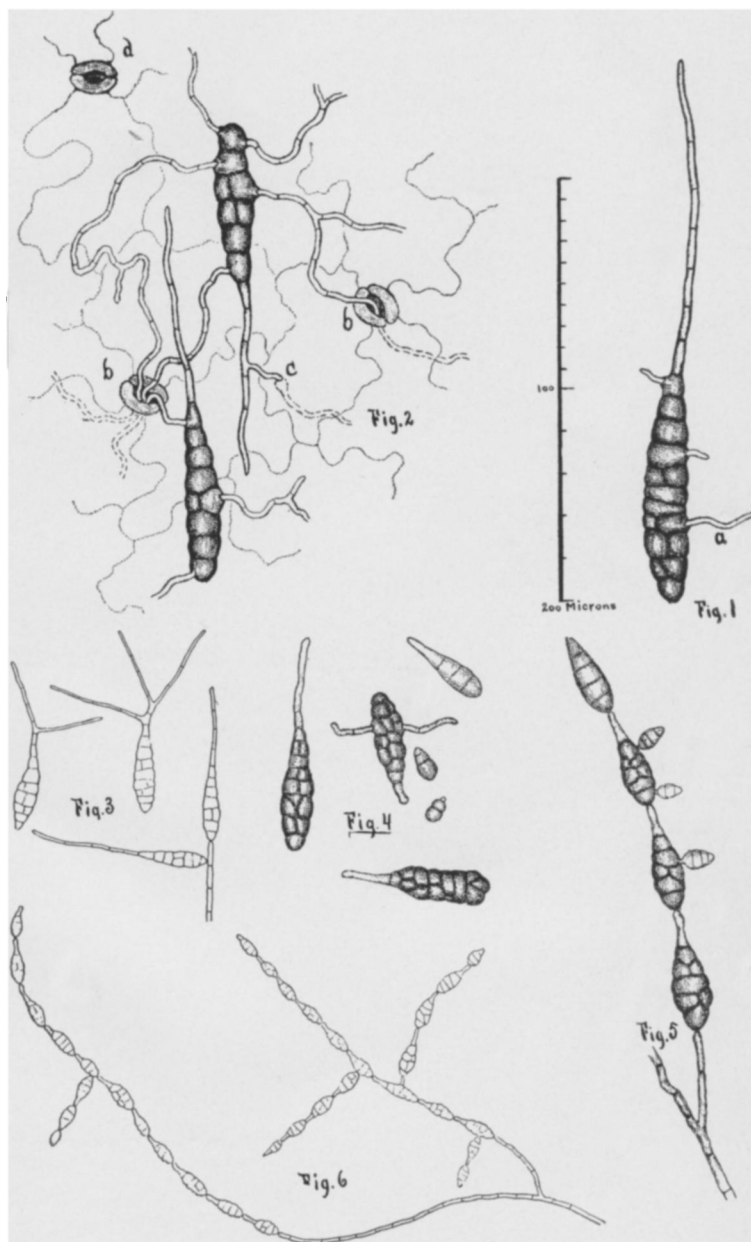
(Plate 308.)

During the summer of 1896 we were engaged at the University of Vermont in the study of certain plant diseases, particularly the early blight of potatoes. The economic results of the work have been fully treated by Professor Jones in the Ninth Annual Report of the Vermont Agricultural Experiment Station of 1895, issued in December, 1896.

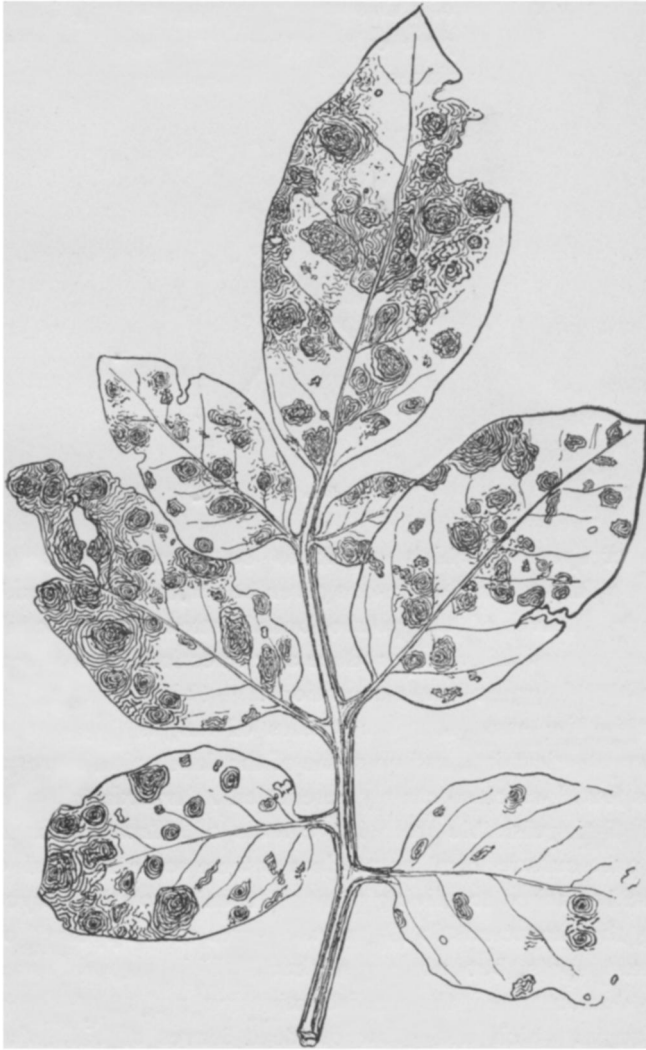
The present article aims to deal more fully with the taxonomic results of the work than was possible in the article cited above. Careful cultures, which were begun by Mr. C. C. Tracy the winter before, were carried on for several months and established beyond a doubt that two entirely distinct species of *Alternaria* were found on the cultivated potato; and a study of material from many different localities has also shown that these two species have not been distinguished by most students of the early blight, but have both passed under the name of *Macrosporium Solani* E. & M. Even Dr. Paul Sorauer (*Zeitschrift für Pflanzen Krankheiten*, 6: Heft I.) failed to distinguish the two species, although he made cultures from diseased leaves bearing both fungi, as is clearly indicated by his figures and the fact that both species were raised from potato leaves sent Professor Jones by Dr. Sorauer.

The significance of this separation of the two species lies in the fact that one of the species is an active parasite causing the destructive early blight of the potato, while the other is in no way parasitic but a saprophyte growing on most decaying vegetable matter of every sort, being easily compared in this respect to the omnipresent *Cladosporium herbarum*. The true *Macrosporium Solani* E. & M., is the parasitic species. It is very destructive to the leaves of the potato early in the season before *Phytophthora infestans* begins to affect them. It forms peculiar "target boards" markings on the leaves as shown in this figure.

In the central portions of these spots the characteristic spores may usually be found. We have seen whole fields with foliage so



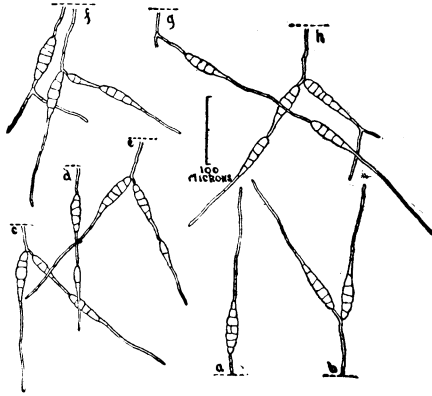
ALTERNARIA.



riddled with these “target boards” that the growth of the crop was stopped and the plants practically killed, showing only a little green at the top of the stems. The parasitism of this species was fully proved by experiments which are described in detail in the report above mentioned.

To state the case in a word, healthy plants under normal out-of-door conditions were successfully inoculated with spores from a pure culture made in the University of Vermont Laboratory.

Usually the spores of this species are borne singly, but in one particularly luxuriant pure culture they were found in chains as is here shown. This places the species in the genus *Alternaria*.



The other species, which ought to be known by the name *Alternaria fasciculata*, for reasons given below, is found abundantly on the dead leaves of the potato, but all attempts at inoculation of living tissues failed to produce any infection, even under the most favorable green house conditions.

During the same summer studies of fungus diseases of the onion were undertaken and on some of the dead onion leaves a fungus was found which so closely resembled *Alternaria fasciculata* as to be indistinguishable from it. Spores of *Alternaria fasciculata* from a pure culture from potato leaves were sown on dead onion leaves still attached to a living plant. A rank growth of mycelium bearing the characteristic *Alternaria* spores soon appeared on the inoculated spots, but none elsewhere. This experiment thoroughly demonstrated the indiscriminating nature of the plant, for a fungus which will grow on dead leaves of onions and of potatoes can scarcely be restricted to any group or groups of plants.

When later on in the summer the study of the tomato rot was taken up, it was found that the fungus which causes the black patches on the rotting fruit was an *Alternaria* not distinguishable from the one on the onion and the potato. It was further proved that this fungus did not cause the rot, for green tomatoes inocu-

lated with spores from a pure culture from the tomato remained for ten days in a moist chamber until they ripened without showing signs of the rot, and cultures made from tomatoes just beginning to rot would not yield the *Alternaria*. *Alternaria fasciculata* was found on the dead leaves of beans, cabbage, *Lathyrus palustris*, on hulls of oats and dead stems of buckwheat; also on dead leaves of corn where it equals *Macrosporium maydis* E. & E., on pasteboard, equalling *M. chartarum* Pk., on ripe pods of radish, equalling *M. fasciculatum* E. & E.

Doubtless, further investigations will identify many other *Macrosporium* species with this omnipresent saprophyte, and doubtless an older name than the one given above will be given to it.

ALTERNARIA SOLANI (E. & M.) Sorauer, Zeit. Pfl. Krankh. 6: 6. 1896.

*Macrosporium Solani* E. & M. Am. Nat. 16: 1003. 1882.

Conidiophores dark brown, erect or ascending, somewhat curved, septate, 50–90 by 8–9 $\mu$ ; conidia obclavate, brown, 145–370 by 16–18 $\mu$ , terminating in a very long hyaline septate beak, equalling fully  $\frac{1}{2}$  length of spore, body of spore with 5–10 transverse septa, longitudinal septa few or lacking.

Forming characteristic target-board markings on leaves of *Solanum tuberosum*; sporulating sparsely in pure cultures. (Pl. 308, figs. 1, 2, 3.)

ALTERNARIA FASCICULATA (C. & E.)

*Macrosporium chartarum* Pk. 25th N. Y. Report. 93. 1873. Not Preuss. 1848.

*Macrosporium fasciculatum* C. & E. Grevillea, 6: 6. pl. 96. 1877.

*Macrosporium Maydis* C. & E. l. c. 87.

*Macrosporium tomato* Cooke, Grevillea, 12: 32. 1883–84.

Conidiophores brown, erect or ascending, irregularly curved, solitary or caespitose, septate, diameter uniform, 40–130 $\mu$  long by 3 $\mu$  wide; conidia dark brown, oblong-ovate, minutely apiculate, 9–14 $\mu$  wide by 35–90 $\mu$  long, endochrome transversely 2–7-septate, with usually several longitudinal septa, the apical cell short or elongated into a straight somewhat hyaline beak.

Fruiting freely in pure cultures. On dead leaves and decaying vegetable matter of all kinds. (Pl. 308, figs. 4, 5, 6.)

The spores vary a great deal according to the stage of development, as seen in the figures, which accounts for the discrepancies in the descriptions.

There has been no opportunity of comparing this species with *Alternaria chartarum* Preuss; (Sacc. Syll. 4: 546,) consequently the above binomial has been used.

Careful comparisons have been made with Ellis & Everhart's Fungi Columb. 396, *Macrosporium chartarum* and 399, *M. fasciculatum*.

### Two new Bolivian Ferns of the Miguel Bang Collection.

BY B. D. GILBERT.

There are about fifty species of ferns belonging to the Miguel Bang collection yet to be published. All of them, however, belong to well established and recognized species except the two described below. The only other genus of the collection containing especially desirable species is *Acrostichum*, which is particularly strong; and while the specimens do not always contain fruited fronds, they are of such a character that little doubt can be entertained in regard to the identity of the species.

The new species and variety are as follows:

#### BLECHNUM NIGRO-SQUAMATUM n. sp.

Stipes 1 ft. long, stout,  $\frac{1}{4}$  in. diameter, furrowed, thickly clothed for 6 in. from base with narrow lanceolate acuminate black scales  $\frac{1}{2}$ – $\frac{3}{4}$  in. long; rachis strong, stramineous, naked, deeply channeled on upper side, with a wing on each edge in upper  $\frac{3}{4}$  of frond connecting the pinnae; frond 4–4 $\frac{1}{2}$  ft. long, 1 ft. broad in center, fully pinnate in lower quarter, tapering rather abruptly upward and moderately downward; pinnae numerous, 6–7 in. long in middle of frond,  $\frac{1}{2}$ – $\frac{5}{8}$  in. wide, dilated on both sides at base and slightly connected except in lower quarter; lower pinnae 2 in. apart, reduced to 2 in. long, but broader in comparison, blunt but not rounded at tip, mid-pinnae about same width throughout until within 1–1 $\frac{1}{2}$  in. from tip, where they decrease and become acute; edge finely serrate and wavy; texture coriaceous, both surfaces naked; costae stramineous, conspicuous; veins distinct, simple and occasionally forked; sori extending from near the base of costa on each side, to about 1 in. from tip